



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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| <p>(54) Title: <b>AN AUTOMATIC REGISTER CUTTING METHOD AND AN AUTOMATIC REGISTER CUTTER FOR CARRYING OUT THE METHOD</b></p> <div data-bbox="243 1155 1380 1659"> </div> <p>(57) Abstract</p> <p>The present invention relates to a method of automatically cutting indexes and an automatic index cutting machine (10) for carrying out the method. The inventive index cutting machine (10) is constructed of (n) number of modules (12:1-12:n), where each module includes a counting arrangement which functions to count a predetermined number of pages automatically for a specific index indentation, and a knife arrangement for cutting this predetermined number of pages. The book is transported between the modules (12:1-12:n) hanging from a transporting arrangement which includes a transporter (20) which holds the book hanging from its spine. Each module (12:1-12:n) counts up to an index indentation and the index indentation is then cut in the knife arrangement, whereafter the book is transported to the next module in which a count is made to the next index indentation and the index indentation is cut, this procedure being repeated module after module.</p> |           |   |

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AN AUTOMATIC REGISTER CUTTING METHOD AND AN AUTOMATIC  
REGISTER CUTTER FOR CARRYING OUT THE METHOD

5 The present invention relates to a method of automati-  
cally cutting book indexing indentations and an auto-  
matic index cutting machine for carrying out the  
method.

10 Present-day machines which cut indexing indentations  
or index tabs in pages that are larger than A5 are  
semiautomatic. A greater part of the work with these  
index cutting machines is effected manually. The  
number of pages that shall lie beneath a given index  
15 indentation or index tab are turned over by hand and  
then inserted manually beneath the reference. The work  
that is carried out automatically in such semiautomat-  
ic index cutting machines is the work of cutting an  
index indentation and re-adjustment to the next fol-  
lowing index indentation. These procedures are carried  
20 on a book that lies flat on a supportive surface. The  
drawbacks with such semi-automatic index cutting  
machines is that they require a work force to carry  
out the manual procedures and that production is  
relatively low. These drawbacks are eliminated by the  
25 inventive automatic index cutting machine and automat-  
ic index cutting method having the characteristic  
features set forth in the characterizing clause of  
Claim 1 and Claim 7 respectively. The inventive index  
cutting machine is constructed of modules, where each  
30 module includes a counter which automatically counts a  
predetermined number of pages for a specific index  
indentation, and knife means for cutting said prede-  
termined number of pages. The book is transported  
between the modules while hanging from a trans-  
35 portation device. In each module, a count is made up  
to the page on which an index or reference indentation  
is to be made and the page is then cut in the knife  
arrangement, whereafter the book is transported to the  
next module where a count is made to the intended

place of the next index indentation and this page is cut, this procedure being repeated in module after module.

5 The present invention will now be described in more detail with reference to an exemplifying embodiment thereof and also with reference to the accompanying drawings, in which

10 Figure 1 is a schematic elevation of one embodiment of the inventive automatic index cutting machine;

Figure 2 is a sectional view of part of the inventive automatic index cutting machine shown in Figure 1; and

15 Figure 3 is a perspective view of a counter included in the inventive automatic index cutting machine.

The exemplifying embodiment of the inventive automatic index cutting machine or index cutting machine 10 illustrated in Figures 1 and 2 includes a number (n) of modules 12:1-12:n, where each module 12:1-12:n includes a counter (see Figure 3) and a knife arrangement 28. The index cutting machine 10 also includes a book storage means 14 for books 26 and an infeed means 25 16 which functions to feed one book 26 at a time from the storage means 14 to a transporter 20 which forms part of a transportation arrangement 40 and firmly holds the book 26 by its spine. The cutter 10 also includes an outfeed means 18 which discharges the processed books from the indexing machine, i.e. books in which all index indentations or index tabs have been cut. The illustrated embodiment of the indexing machine 10 also includes a transporter switch 22 which 35 changes the direction of movement of the transporter 20, and a return table 24 which returns the transporter 20 to the beginning of the indexing machine 10.

As shown in Figure 2, each knife arrangement 28 includes a knife means 30, which moves linearly and which may consist of a knife blade. Although not shown, the knife is moved by means of a pneumatic piston-cylinder device which translates said movement to the knife means 30 via a link system (not shown). The knife arrangement 28 also includes a spring-biassed anvil (a clamping strip not shown) which holds the index indentation firmly at the cutting moment. It will be noted that the knife means 30 cuts in both directions of its linear movement.

Figure 3 is a perspective view of a counter 32 included in the inventive automatic index cutting machine 10. The counter 32 includes a tongue-like element 34 which oscillates backwards and forwards when activated, and a pin 38 which rotates when activated. When a book 26 is transported to a counter 32, the book 26 lies against the tongue-like element 34 and a page is sucked firmly against the element by the action of a subpressure which communicates through a small hole 36 in the tongue-like element 34. When a start signal is delivered by a control unit (not shown), both the tongue-like element 34 and the pin 38 are activated mechanically by levers from one and the same motor. When the tongue-like element 34 oscillates, the leaf or page firmly held to the element by suction is curved away from the remaining pages such as to create between the pages a space into which the pin 38 can enter. The pin 38 then carries the page adhering to the element 34 to the rear side of said element and a new page is sucked firmly onto said element 34. The vacuum system also includes a valve (not shown) which is opened and closed in dependence on the vacuum that prevails. The valve detects when a page has been sucked firmly onto the tongue-like element 34 and can thus confirm that a page has been counted. The aforesaid control unit controls the number of pages that each counter 32 is to count, i.e. the number of pages

that shall be included in each index indentation. The predetermined number of pages for each individual index indentation are fed into the control unit by means of an infeed device (not shown).

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The inventive automatic index cutting machine 10 operates in the following manner: Books are fed singly from the storage device 14 to the transporter 20 by means of the infeed device 16. The transporter 20 holds the book by its spine. The book hangs from the transporter 20 and is carried thereby to the first module 12:1, where the bottom cover is folded down beneath a guide by means of a suction feed. The book is then transported to the counter arrangement 32 in the first module 12:1, where a number of pages are counted in accordance with a preset program. The pages are then folded down beneath a guide and the book is transported to the knife arrangement 28, where the index indentations are cut and folded beneath the guide. The book is then transported to the next module 12:2 where a count is made up to the next index indentation and a cut is made, this procedure being repeated module for module. The books are transported in a continuous sequence, since all counter arrangements 32 and knife arrangements operate simultaneously on one book. A machine intended to cut thirty index indentations will include thirty modules. The first index indentation 1 is made in the first module 1 and the thirtieth index indentation is made in module 30. It is also possible to produce a book containing thirty index indentations in a machine that consists solely of fifteen modules, although this will halve the production rate since it is necessary to pass the book through the machine twice.

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It will be understood that the aforescribed exemplifying embodiment of the invention is merely an example of how the invention can be realized and in no way

limits the invention, the scope of which is defined in  
the following Claims.

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Claims

1. An automatic book index cutting machine (10),  
c h a r a c t e r i z e d in that the index cutting  
5 machine includes a plurality (n) of modules (12:12:n)  
which each includes a counter arrangement (32) which  
functions to count a predetermined number of pages for  
a specific index indentation, and a knife arrangement  
(28) for cutting said predetermined number of pages  
10 for said specific index indentation; and in that the  
index cutting machine (10) also includes a book trans-  
porting arrangement (40).
2. An automatic index cutting machine (10) according  
15 to Claim 1, c h a r a c t e r i z e d in that the  
transporting arrangement (4) includes a plurality of  
transporters (20) which are constructed to hold and  
transport the books (26) by their respective spines.
3. An automatic index cutting machine (10) according  
20 to Claim 2, c h a r a c t e r i z e d in that the  
machine also includes a book storage device (14), a  
book infeed device (16) which functions to feed a book  
from the storage device (14) to one of said transport-  
25 ers (20), and a book outfeed device (18) which func-  
tions to feed indexed books (26) from the machine.
4. An automatic index cutting machine (10) according  
30 to Claim 3, c h a r a c t e r i z e d in that the  
machine also includes control means for controlling  
the counters (32), such that each counter (32) will  
count a predetermined number of pages for a specific  
index indentation through the agency of a programming  
unit connected to said control means.
- 35 5. An automatic index cutting machine (10) according  
to Claim 4, c h a r a c t e r i z e d in that each  
counter (32) includes an oscillatable tongue-like  
element (34) which is provided with a hole (36) and



which is oscillated by a motor through the medium of said control means, and a pin (38) which is rotated through the medium of said control means and said motor, wherein a page of the book (26) is sucked  
5 firmly against the tongue-like element (34) by sub-pressure acting through the hole (36) in said element, and wherein the two movements coact mutually in a manner to separate the counted pages from uncounted pages by means of the tongue-like element (34).

10 6. An automatic index counter (10) according to Claim 5, c h a r a c t e r i z e d in that each knife arrangement (28) includes a spring-biassed anvil means which holds firmly those pages to be cut, and a lin-  
15 early movable knife means (30) which is driven by a pneumatic piston-cylinder device included in said knife arrangement (28), via a link system.

20 7. A method for automatically index cutting books with the aid of an index cutting machine (10) which includes a plurality (n) of modules (12:1-12:n), each including a counting arrangement (32) for counting a predetermined number of pages for a specific index indentation, and a knife arrangement (28) for cutting  
25 said predetermined number of pages for said specific index indentation, said method being

c h a r a c t e r i z e d by the steps of

a) feeding a book (27) by means of an infeed device (16) to a transporter (20) included in the index  
30 cutting machine (10) and holding the book (26) firmly by its spine;  
b) folding a cover side by suction beneath a tongue-like element (34) included in the counting arrangement (32);

35 c) transporting the book (26) suspended by the transporter (20) to the first module (12:1);

d) counting with the aid of said counting arrangement (32) a predetermined number of pages corresponding to

the first index indentation which is folded down  
beneath the tongue-like element (34);

e) transporting the book to the knife arrangement  
(28) in the module (12:1) for cutting of the first  
5 index indentation; and

f) transporting the book (26) to the next module  
(12:2-12:n) and repeating steps d) and e) for a total  
of n number of times.

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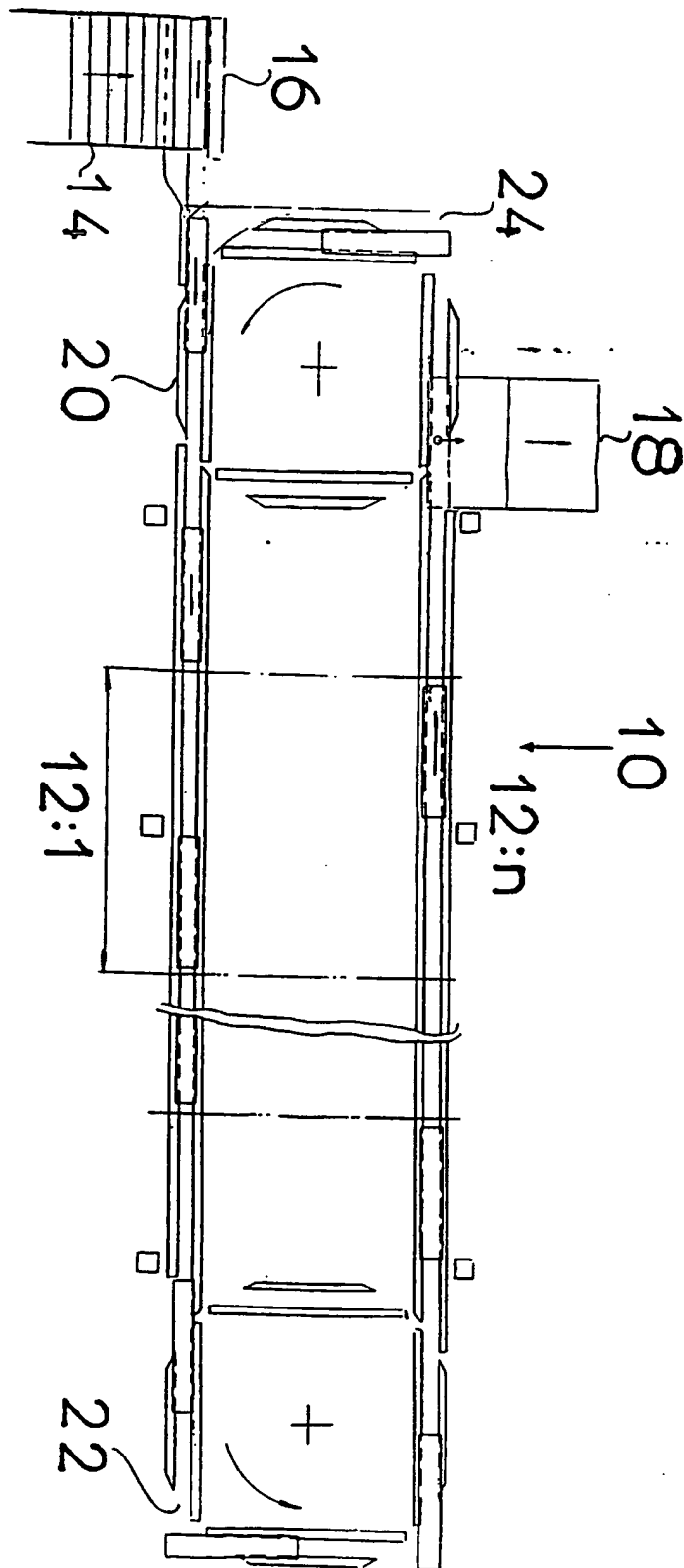


Fig. 1

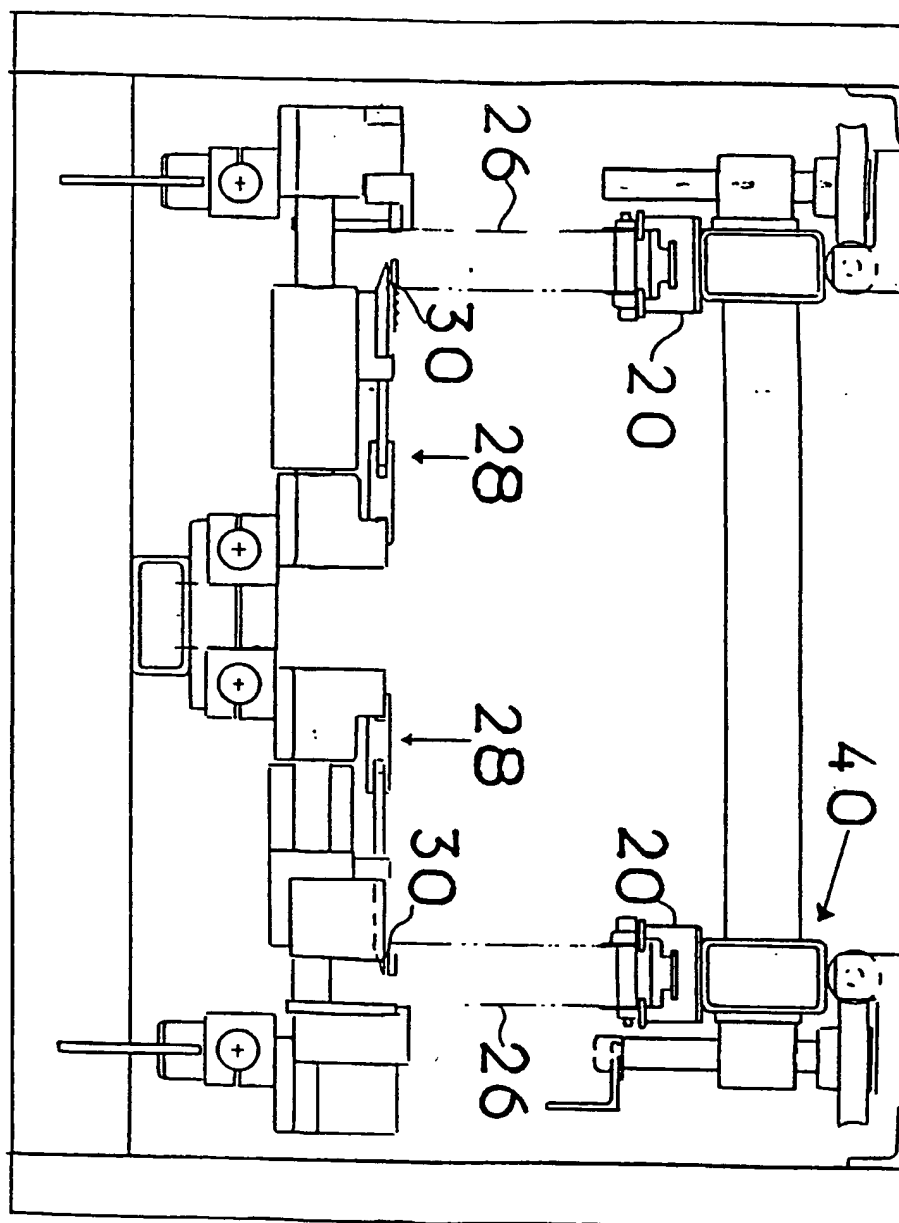


Fig.2

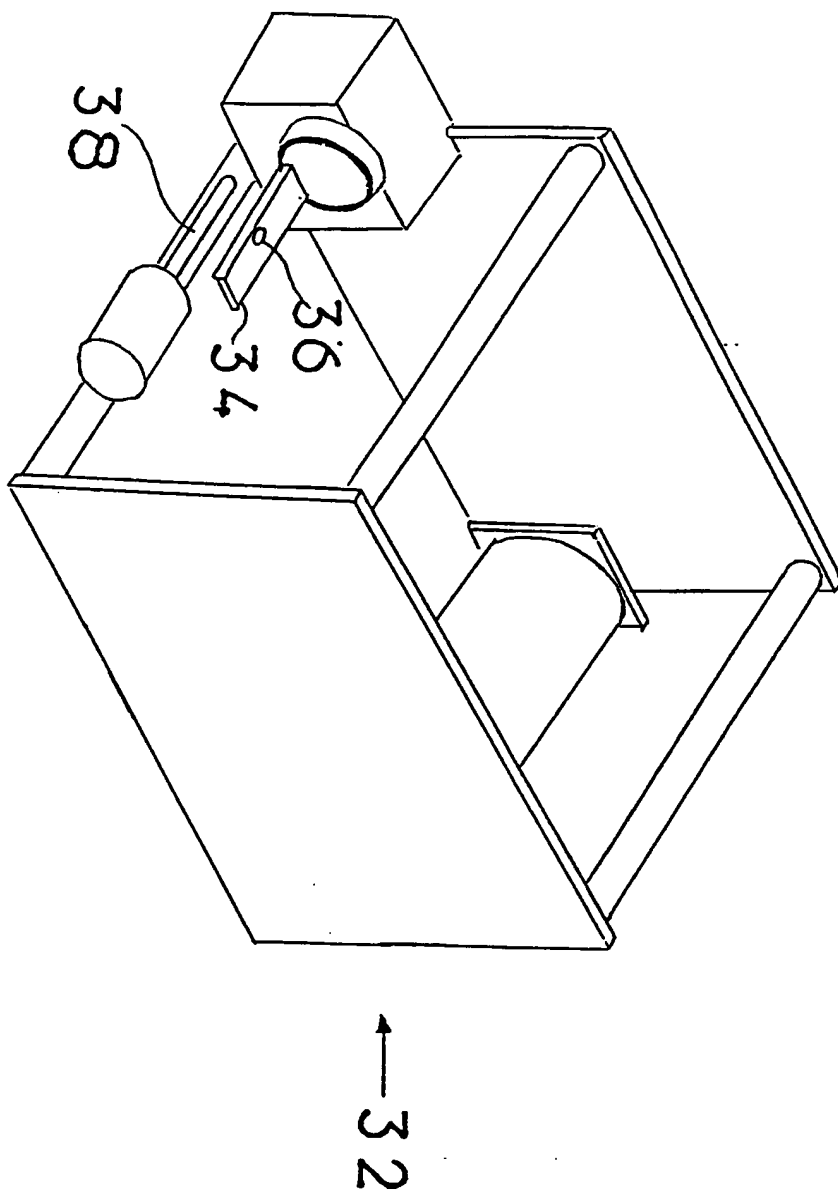


Fig. 3

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 93/00559

## A. CLASSIFICATION OF SUBJECT MATTER

IPC5: B42F 21/12, B26D 3/14

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC5: B42F, B42C, B42D, B65H, B26D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                             | Relevant to claim No. |
|-----------|--|-----------------------|
| X         | US, A, 2763324 (C.L. LOVERCH ET AL), 18 Sept 1956<br>(18.09.56), column 5, line 11 - line 74<br>--             | 1-6                   |
| X         | US, A, 2489825 (H. SIEB), 29 November 1949<br>(29.11.49), column 7, line 15 - column 8, line 31<br>--<br>----- | 1-6                   |

☐ Further documents are listed in the continuation of Box C.
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**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

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International application No.

PCT/SE 93/00559

| Patent document<br>cited in search report |         | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|---|---------|---------------------|----------------------------|---------------------|
| US-A-                                     | 2763324 | 18/09/56            | NONE                       |                     |
| US-A-                                     | 2489825 | 29/11/49            | NONE                       |                     |